

DØ Upgrade Monthly Progress Report

for the month of December, 2000

Subsystem: Master Schedule and Overview
WBS: All
Date Submitted: 2/19/01
Submitted By: Harry Weerts, Bill Freeman

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M1-Solenoid Delivered to Fermilab	5/12/97	5/12/97	0 w
X	M2-Central Preshower Module Fabrication Complete	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	5/21/98	5/21/98	0 w
X	M1-Solenoid Installed and Tested	9/30/98	9/30/98	0 w
X	M3-Level Ø-South Installed	5/8/00	2/9/00	12.6 w
X	M2-Muon End Toroids Installed on Platform	8/4/00	11/15/00	-14.2 w
X	M1-Begin Shield Wall Removal/Ready to Roll-in	11/7/00	11/22/00	-2.2 w
	M1-Detector Rolled-in and Hooked Up	2/27/01	2/2/01	3.4 w

Note: The full set of reportable milestones are collected and sorted by date at the end of this report. Also, a separate monthly report for the solenoid project will no longer be included, since that project is now formally complete. The reportable milestones associated with the solenoid project are now included in the above list.

Areas of Concern

Technical

The repair of Level 2 alpha boards continued. The DAQ/Trigger system is running at a low rate and will continue to do so. The final electronics components for Level 1, 2, 3, and the fiber tracker are experiencing technical problems.

Schedule

None

Resources

None

Cost

None

Change Requests

None

Progress Summary

The second half of the silicon detector (SMT-N) was installed. Testing of the production interface cards is going well at Kansa State University. Progress on the Forward Muon System is excellent, and we are completing the B-layer installation, the final muon system layer to be installed. The C-layer trusses are in the Collision Hall. The waveguides for the fiber tracker are installed, checked out, and repaired/replaced where necessary. All sub-detectors will be installed by the middle of February.

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Subsystem: Silicon Tracker
WBS: 1.1.1
Date Submitted: 1/23/01
Submitted By: Marcel Demarteau, Ron Lipton

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	H Half-Wedge Fabrication 20% Complete	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	10/26/99	10/20/99	0.6 w
X	9 Chip Ladder Fabrication 20% Complete	11/4/99	11/3/99	0.2 w
X	F Wedge Assemblies 20% Complete	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	1/31/00	1/3/00	3.9 w
X	H Half-Wedge Fabrication 80% Complete	3/29/00	2/23/00	5 w
X	6 Chip Ladder Fabrication 80% Complete	7/12/00	3/14/00	16.8 w
X	Low Mass Cables Available For Silicon South	7/17/00	NA	0 w
X	9 Chip Ladder Fabrication 80% Complete	7/31/00	3/27/00	17.4 w
X	F Wedge Assemblies 80% Complete	7/31/00	4/26/00	13.2 w
X	Low Mass Cables Available for Silicon North	9/4/00	NA	0 w
X	M2-First Silicon Tracker Barrel/Disk Module Complete	9/14/00	1/24/00	33 w
X	South H-Disks Ready to Move to DAB	10/13/00	7/3/00	14.4 w
X	South Half-Cylinder Complete and Ready to Move to DAB	10/25/00	8/1/00	12.2 w
X	M3-All Silicon Tracker Barrels/Disks Complete	11/22/00	8/25/00	12.6 w
X	North Half-Cylinder Complete and Ready to Move to DAB	12/12/00	9/18/00	12 w
X	M1-Central Silicon Complete	12/12/00	9/18/00	12 w
	M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	2/9/01	9/25/00	18.8 w

Areas of Concern

Technical

None

Schedule

None

Resources

None

Cost

There are still some costs outstanding for completing electronics installation and power supply assembly.

Change Requests

None

Progress Summary

The second half of the DØ SMT central silicon detector was installed in the DØ detector on December 18th, completing the construction and delivery of the central silicon tracker. Construction of the four H-disks was completed and installation of the H-disks awaits installation and alignment of the beam pipe. Installation and testing of the cooling, purge gas, interlock, and monitoring systems was completed. The cooling systems are running in bypass mode until operational clearance is obtained for the cooling system.

High mass cables have been installed for the south half of the tracker (SMT-S) and final cabling awaits fabrication and installation of power supplies and fuse panels. The full data path from the detector “cathedral” area has been exercised using final components. Interface card production and testing has gone well and we expect to have the full

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complement of cards available by the end of February. Our cabling and testing rate will be limited by the time available in the detector intercryostat area after roll-in.

The 10% test was decommissioned and cleanup of the various production and testing areas is underway. We are in the process of preparing for an “as built” radiation test of a set of ladders and wedges in the Fermilab booster. A set of detectors has been selected and tested. The run will begin in February.

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Subsystem: Fiber Tracker and VLPCs
WBS: 1.1.2
Date Submitted: 1/23/01
Submitted By: Alan D. Bross

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	<i>Detector</i>			
X	M2 - Assembly Design Complete	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	9/2/99	9/2/99	0 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	11/5/99	11/12/99	-0.9 w
X	M2-Fiber Tracker Assembly Begun	2/1/00	12/6/99	6.2 w
X	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	3/2/00	1/28/00	5 w
X	M3-Fiber Tracker Ribbon Fabrication Complete	5/10/00	3/6/00	9.5 w
X	M3-Fiber Tracker Ribbon Mounting Complete	5/13/00	4/20/00	3.3 w
X	M2-Fiber Tracker Assembly Complete	5/26/00	5/4/00	3.3 w
X	Waveguide Production 50% Complete	7/24/00	1/29/00	24.6 w
X	M3-Waveguide Production Complete	11/7/00	6/5/00	22 w
	<i>VLPCs</i>			
X	M2-VLPC Production 50% Complete	8/31/97	8/31/97	0 w
X	M3-VLPC Cryo System Operational	8/18/00	6/12/00	9.6 w
X	M3-VLPC Cassette Assembly 50% Complete	9/13/00	4/12/00	21.5 w
	M3-VLPC Cassette Assembly Complete	2/12/01	8/22/00	23.4 w

Areas of Concern

Technical

None

Schedule

None

Resources

None

Cost

None

Change Requests

None

Progress Summary

- 77 VLPC cassettes fabricated
- 66 cassettes installed at DAB
- 2 cassettes ready for installation
- Waveguide hookup to installed cassettes completed
- All waveguide routing complete

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Subsystem: Forward Preshower
WBS: 1.1.4
Date Submitted: 1/23/01
Submitted By: Abid Patwa

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Forward Preshower Module Fabrication Begun	11/4/98	11/4/98	0 w
X	M3-1st Forward Preshower Detector Complete	2/24/00	1/12/00	6.2 w
X	Module Fabrication and Testing Complete	4/1/00	12/10/99	14 w
X	M3-2nd Forward Preshower Detector Complete	4/3/00	3/8/00	3.6 w

Areas of Concern

Technical

Completion of all required waveguides for the FPS is still a concern, as it awaits delivery of an additional supply of clear fiber, expected in early 2001. This causes the installation of all FPS waveguides on the cryostat heads to begin later than anticipated.

Schedule

FPS waveguide completion and hookup is driven by the delivery of the supply of clear fiber mentioned above. However, the cabling scheme on each EC head is presently being re-evaluated in order to understand whether a partial waveguide installation is possible. This may allow the installation time of the remaining cables to be shortened.

Resources

None

Cost

None

Change Requests

None

Progress Summary

- Waveguide production continued at Notre Dame and Indiana University, with fibers for all cables that will occupy the FPS shower layers 1 and 2 pulled. Cable production for the forward MIP-detecting layers (3 and 4) started, using an available but limited supply of fiber from the CFT.
- Installation of final VLPC warm-end connector assemblies on the completed waveguides continued at Indiana University, following the FPS mapping logic.
- A mapping and labeling scheme was established for the twisted-pair ribbon cables controlling the LEDs located within the FPS. Installation within the end calorimeter cable winders is scheduled to begin in late January 2001, jointly with the remaining ICD and Level 0-Luminosity Counter cables.

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Subsystem: Tracking Electronics
WBS: 1.1.5
Date Submitted: 2/5/01
Submitted By: Marvin Johnson, Fred Borcharding

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	First Readout Crate Installed & Working	11/16/99	12/2/99	-2 w
X	10 Digital Boards Available	7/28/00	3/22/00	18 w
X	Ten 8-chip Analog Boards Available	8/8/00	4/19/00	15.4 w
	Multichip Modules Received	1/30/01	2/23/00	47 w
	Mixer Boards Ready	1/31/01	6/22/00	30.2 w

Areas of Concern

Technical

None

Schedule

The printed circuit boards for the analog front-end board were all mis-manufactured. They all failed the final board test. Thus they all need to be remade, which means that we will not have PC boards until the end of February.

Resources

None

Cost

None

Change Requests

None

Progress Summary

Silicon Electronics

Silicon electronics is essentially complete. Firmware bugs continue to be found but we can typically run several hours between failures. Interface boards are all built, but 5 out of 166 boards need an additional chip that is on order. Only 144 are needed for the experiment. We project that we will have enough tested boards for the experiment by late January. Final hookup of the detector is in full swing. It is not likely that the silicon detector will be fully cabled up by the March 1 start-up date.

Fiber Tracker Electronics

The fiber tracker electronics is making good progress. 1800 multichip modules have been delivered and we expect the remaining 400 in January. All the digital motherboards are here and the first 24 of the daughter boards (out of 80 needed for the experiment) have arrived. About 80% appear to work right out of the box. The large daughter board for the level 2 and level 3 trigger has been sent out for parts loading. This should be back by late January or early February. We will not have AFE8 boards until late February. This will delay installation of the VLPC boards until April. The mixer boards are being reviewed, and first boards should be here by late January.

Installation of the other equipment is proceeding well. We expect that all the digital boards as well as the infrastructure for the analog boards (cables, power supplies, etc.) will be in place by March 1.

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Subsystem: Calorimeter Electronics
WBS: 1.2.1
Date Submitted: 2/2/01
Submitted By: Mike Tuts

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SCA Testing Complete	11/23/99	12/15/99	-2.8 w
X	Shaper Hybrid 50% Complete	2/22/00	5/9/00	-11 w
X	M2-Calorimeter Preamp System Test Complete	7/13/00	3/31/00	14.4 w
X	Daughterboard Vendor Production Complete	12/7/00	6/16/00	24 w
	Timing System Installed	12/13/00	8/18/00	16 w
X	M3-Calorimeter CC,ECN Preamp Installation Complete	1/15/01	3/31/00	39.4 w
	BLS Motherboard Assembly Complete	2/5/01	8/7/00	24.6 w
	M2-Calorimeter BLS Assembly Complete	2/26/01	9/26/00	20.6 w

Areas of Concern

Technical

None

Schedule

- Lack of access and manpower contributed to the delays in installation. There were some vendor delays. We expect to have the CC and one EC fully populated by March 1.
- There are delays in the construction of the trigger pickoff summers. These were dependent on studies to establish the initial resistor values. Prototypes will exist by March 1, but the full complement will not be available before the end of March.
- The "BLS Motherboard Assembly Complete" milestone will likely be delayed by 1-2 weeks due to vendor delivery problems. The M2 milestone "Calorimeter BLS Assembly Complete" is coupled to the previous milestone and will also be delayed by a similar amount.

Resources

We have made manpower requests, but calorimeter priority is not sufficiently high to have had any additional manpower assigned.

Cost

None

Change Requests

None

Progress Summary

- 50% of the preamps, power supplies and preamp infrastructure are now ready.
- 25% of the BLS, power supplies and BLS infrastructure are now ready.
- BLS motherboards and daughtercards are nearing completion.
- Final tweaks to the pulser system are underway.
- Commissioning is underway.

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Subsystem: Intercryostat Detector
WBS: 1.2.2
Date Submitted: 1/23/01
Submitted By: Andy White, Lee Sawyer

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M3-ICD Tile Modules/Boxes Ready	4/19/00	1/18/00	13.2 w
X	M2-ICD Modules Arrive at Fermilab	4/24/00	1/25/00	12.8 w
X	M3-InterCryostat Detectors Installed	5/5/00	2/1/00	13.6 w
	Drawers Ready	12/20/00	12/14/99	50.2 w

Areas of Concern

Technical

- A scheme for fiber cable routing on the EC's is still needed.
- The HV fanout boxes in the MCH need to be modified to allow adjustment on channel 1.

Schedule

None

Resources

We will need support (welder/tech) to install links for the fiber cables on the faces of the ECs

Cost

An extension of the end date of our present MOU's (UTA and LaTech) through June 30, 2001 was requested.

Change Requests

None

Progress Summary

- The second pair of crates was delivered and installed at Fermilab.
- The assembly of a second test stand for ICD module MIP calibration began at Fermilab.
- An ICD tile module, fiber cables, electronics drawer, and LV and HV supplies were installed in the NE quadrant of the platform to serve as the ICD cosmic commissioning system. Two muon A- ϕ counters, on loan from the muon system, were installed as trigger counters on either side of the ICD tile.
- One quadrant of drawers was completed, MIP signals were verified from the preamps, and the final order for the PMT bases was submitted.
- Approximately 100 ICD PMTs have been retested at UTA.
- Cabling was completed, except for the LV cables.

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Subsystem: Muon Central
WBS: 1.3.2
Date Submitted: 1/31/01
Submitted By: Tom Diehl

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
	CFA Commissioning Complete	2/15/01	7/10/00	30.3 w
	PDT Commissioning Complete	2/20/01	6/9/00	34.8 w

Areas of Concern

Technical

None

Schedule

Commissioning the A- ϕ counter system is still on hold because of lack of physicists.

Resources

During December we held at 3.25 FTE physicists commissioning the three systems that make up the central muon detector. This is not enough.

Cost

None

Change Requests

None

Progress Summary

- There is no more M&S spending to be done on the muon central subproject (WBS 1.3.2).
- The PDT gas system design is nearly finished. All of the piping, pumps, and valves have been specified and ordered. The first steps in assembly were started in December when the old gas system components that are not to be reused were removed from the gas room. There is hope that gas will flow by March 1st.
- In December we abandoned the present version of PDT control-card data-formatting software that ran on an on-board digital signal processor. The reason is the code was not up to specification, causing unrecoverable interrupts in data-taking runs. The interrupts were so frequent as to make system operation impossible in Run II. We enlisted the help of a Fermilab engineer who will supply new software.

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Subsystem: Muon Forward Trigger Detectors
WBS: 1.3.3
Date Submitted: 1/24/01
Submitted By: Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	10/12/98	10/12/98	0 w
X	All Pixel Octants Assembled	2/23/00	4/4/00	-5.8 w
X	All Muon Forward Trigger Detector Planes Installed	1/12/01	8/25/00	18.6 w

Areas of Concern

Technical

None

Schedule

None

Resources

Substantial manpower resources are required for tests, commissioning, and operation of the DØ forward muon trigger system, which has five thousand scintillation counters. Since Fermilab visitors perform major operations, their support is critical for efficient operation of the system.

Cost

None

Change Requests

None

Progress Summary

- Transportation of B-layer pixel octants and their assembly in DØ assembly building began.
- Cabling of A-and C-layer planes is finished.
- Commissioning of C-layer planes is in progress with no serious problems encountered. Our plan is to finish installation of B-layer planes by mid-January and complete cabling and commissioning of all trigger scintillation counters in the collision hall before March 1, 2001.

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Subsystem: Muon Forward Tracker
WBS: 1.3.4
Date Submitted: 1/24/01
Submitted By: Dmitri Denisov

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	1/29/99	1/29/99	0 w
X	Arrival Of C-Layer MDT Modules At FNAL	11/3/99	10/22/99	1.7 w
X	M2-All Muon Forward Tracker MDT Modules At Fermilab	3/30/00	3/10/00	2.8 w
X	B-Layer Octants Assembled	8/24/00	4/18/00	18 w
X	All MDT Octants Assembled	8/24/00	7/14/00	5.8 w
X	Muon Forward Tracker B-Layer Planes Installed	12/22/00	6/15/00	26.2 w
X	All MDT Planes Installed	12/22/00	8/4/00	19.2 w

Areas of Concern

Technical

None

Schedule

None

Resources

Availability of physicists for commissioning of the installed mini-drift tubes planes before and during initial stage of Run II. With 50,000 wires, complex gas, HV and electronics systems, the DØ forward muon system requires considerable manpower resources for commissioning, tests, and operation.

Cost

None

Change Requests

None

Progress Summary

- All sixteen B-layer MDT octants were transported from Lab F and installed on the EF magnets.
- The survey of MDT octants was completed.
- Gas connections and cabling of all B-layer octants was finished.
- Commissioning of eight B-layer octants, including gas, HV and front-end electronics was completed. The fraction of dead channels is about 0.2%, including wires and front-end electronics channels. Group efforts are now concentrated on commissioning and preparations for operation during Run II.

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Subsystem: Muon Electronics
WBS: 1.3.5
Date Submitted: 1/25/01
Submitted By: Bill Freeman

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	MDT ADB Fabrication Complete	12/2/99	12/2/99	0 w
X	MDC Fabrication Complete	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	1/31/00	12/13/99	5 w
X	FEB, CB Production Complete	4/10/00	1/3/00	14 w
X	SFE, SRC Fabrication Complete	9/21/00	2/3/00	32.5 w
X	MRC, MFC Production Complete	10/18/00	3/27/00	28.8 w

Areas of Concern

Technical
None

Schedule
None

Resources
None

Cost
None

Change Requests
None

Progress Summary
The muon electronics project is complete.

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Subsystem: Trigger
WBS: 1.4.1-1.4.5
Date Submitted: 2/3/01
Submitted By: Gerald C. Blazey

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	SLICs Received	12/10/99	11/10/99	4 w
X	M3-Establish Single Crate Internal Data Movement	2/17/00	1/6/00	6 w
X	Preproduction MTCxx, MTFB, and MTCM Complete	10/19/00	1/24/00	38 w
X	M3-Muon Level 1 Trigger Preproduction Testing Complete	11/8/00	4/18/00	28.6 w
X	MBTs Received	1/31/01	3/16/00	44 w
	Production MTCxx, MTFB, and MTCM Complete	3/2/01	6/27/00	34 w
	M3- Cal Readout Available to L2	3/20/01	2/11/00	55.6 w
	Global Installation Complete	3/23/01	7/12/00	35 w
	L2 Cal Installation Complete	3/23/01	8/21/00	29.4 w
	Alpha Cards Received	3/30/01	5/15/00	44 w
	L2 Muon Installation Complete	4/27/01	7/26/00	38 w
	L2 CTT Installation Complete	4/27/01	8/9/00	36 w
	M3-Trigger Level 2 Commissioned	6/4/01	9/21/00	35 w
	M3-L3 Operational (One Full Chain)	6/6/01	6/1/00	51 w

Areas of Concern

Technical

None

Schedule

The AFE8 cards have not yet reached performance specifications. This will result in a delay of central tracking commissioning. Unavailability of Level 2 Alpha cards continues to delay commissioning of the full system. Level 3/DAQ installation has been seriously delayed by production and manufacturing delays.

Resources

The trigger database effort continues to be understaffed.

Cost

Funds may be needed to accelerate Level 1 muon production and Level 2 beta development.

Change Requests

None

Progress Summary

Luminosity Monitor

Fabrication of luminosity monitor electronics began. A plan has been developed for the provision of minimum bias triggers on March 1 using Run I electronics.

Trigger Framework

Operational support of the framework during detector commissioning continued.

Level 1

Work on Level 1 CAL continued with a focus on the simulation of resistor values and prototype hardware.

Production and testing of Level 1 muon cards continued. In particular MTCM testing continued, and MTCxx and MTM cards are at the assembler. Tests of MTC05 MTFB pre-production cards uncovered flaws that have delayed

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final submission of the 05 and 10 cards. MCCM boards are being stuffed, and testing of preproduction MCEN cards was completed. Progress was also made integrating the Level 1 muon into the DAQ system and on the simulation. Testing continued on the first pre-production Level 1 CTT/CPS AFE8 boards. AFE8 production remains on hold until testing is completed. Work on the AFE12 layout and the Mixer Box continued. Significant progress was made on the VHDL coding of the DFE, collectors, and broadcasters. Crate installation continued.

Level 2

Debugging of the Level 2 Alphas continues at both UIC and the CD. Efforts are focusing on repair and preparations to build twelve additional cards. Nearly all the MBT's were received. Work continued validating the performance of the CICs, SFOs, and FICs. Significant work began on the Level 2 beta, a long-term replacement for the alphas. Good progress was made on the operational software for Level 2. Installation of racks was nearly finished.

Level 3/DAQ

Level 3/DAQ support of commissioning continued. The prototype layout of the basic hardware component, the SIB, was sent to the manufacturer for evaluation. Difficulties with the layout have delayed manufacture. Progress on filtering includes improvements in SMT clustering and unpacking, regional tracking, and tau tools. In December the first production release of the trigger simulator was distributed.

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Subsystem: Online
WBS: 1.5.1
Date Submitted: 2/7/01
Submitted By: Stuart Fuess

<u>Done</u>	<u>Reportable Milestone</u>	<u>Date</u>	<u>Baseline</u>	<u>Variance</u>
X	Steady DAQ Running	3/17/00	3/31/00	-2 w

Areas of Concern

Technical

None

Schedule

None

Personnel

None

Cost

None

Change Requests

None

Progress Summary

- The primary activity of the Online system has been in support of commissioning activities. Other than planned system and software upgrade periods (typically one 8-hour period per week), the Online system has been available nearly 100% of the time.
- Controls:
 - The Controls group has enhanced a standard application GUI framework package, and made such available to detector-specific application developers.
 - A standard GUI application for accessing the Rack Monitor Interface was released.
 - The Hardware Database, the ORACLE database for storing the EPICS control system configuration parameters, was updated and the Web interface improved.
- The CRL electronic logbook is now in standard use in the control room.
- The complete data storage system from DAQ to tape continues to be exercised.

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December '00 Financial Summary

The first quarter of fiscal year 2001 closed with obligations for the DØ Upgrade Project totaling \$972K on equipment M&S funds. While a month-to-month Project spending plan is not anticipated, in order to meet completion deadlines, the majority of FY01 equipment funds are expected to be obligated in the first half of the fiscal year. As a result of budget transfers, the Project's FY01 M&S budget allocation is now \$3,365K.

The M&S Upgrade Project balance is currently \$2,629K, excluding contributions and contingency. Contributions to the Upgrade currently total \$1,435K. These contributions reduce the M&S balance. As of the end of December, DØ Upgrade Spokespersons have negotiated additional non-DoE contributions of approximately \$274K. Because the Project managers routinely re-evaluate funding needs, the Estimate-To-Complete (ETC) continues to be synonymous with the Project's M&S balance. The overall cost of the Project has increased. The contingency, which is held by the Directorate, further increases the total Project cost. Additional contingency requests are expected to be presented in early calendar year 2001.

The Project currently has commitments with universities and other institutions in the DØ Collaboration, via active Memoranda of Understanding (MoU), totaling \$5,718K. These funds represent an obligation on the part of the DØ Upgrade Project and are regularly costed each month via invoices received from these institutions as work is completed. In addition, several institutions have made significant contributions to the DØ Upgrade. A list of the institutions involved, as well as a more detailed breakdown of the commitments and costs, follows.

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FY01 Financial Report as of 12/31/00

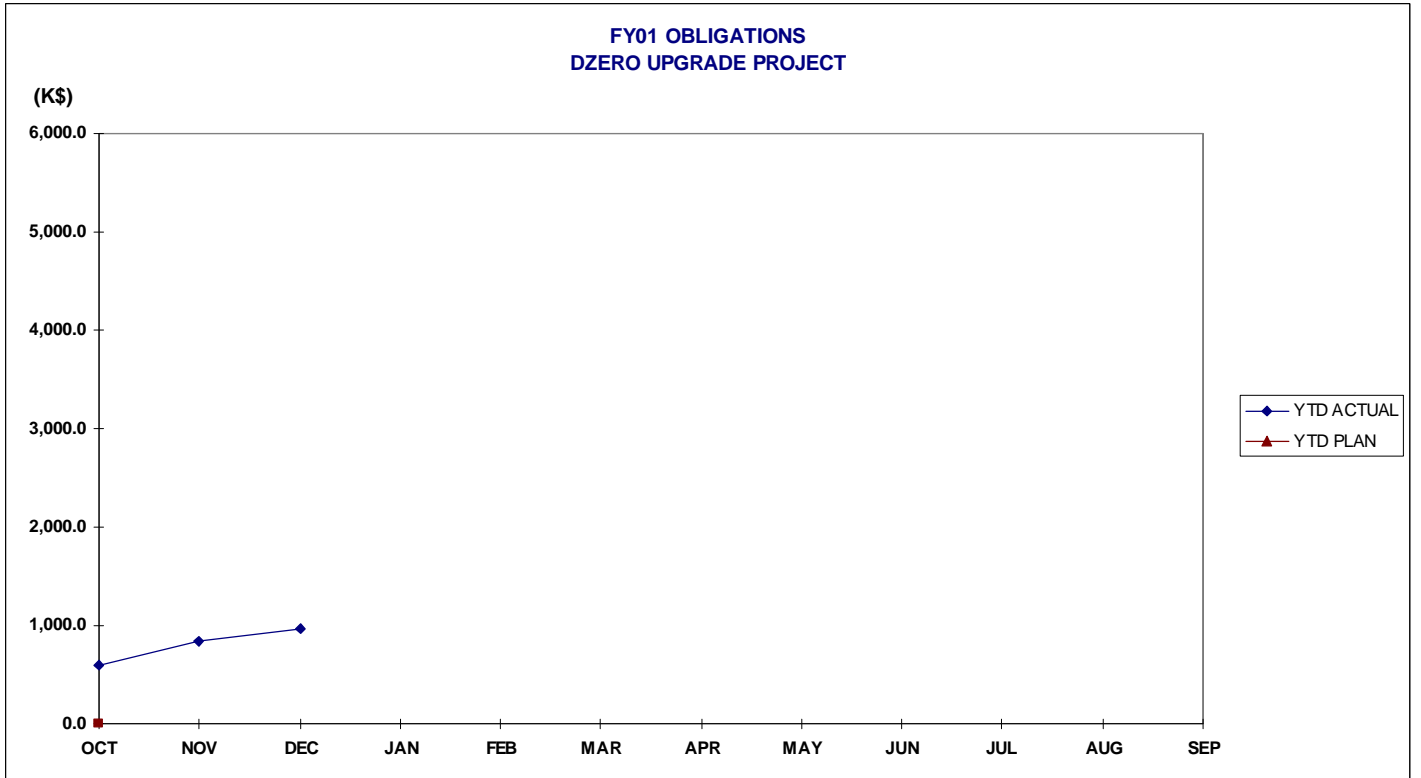
	<u>COST ESTIMATE</u>	<u>PRIOR YR OBLIG</u>	<u>FY 01 YTD OBLIG</u>	<u>PROJECT BALANCE</u>
1 TOTAL DZERO UPGRADE PROJECT	42,374.9	38,774.3	971.5	2,629.2
1.1 TRACKING DETECTORS	20,669.4	19,795.1	498.5	375.9
1.1.1 SILICON TRACKER	8,243.6	7,924.0	234.0	85.6
1.1.2 FIBER TRACKER	7,851.4	7,697.6	104.7	49.1
1.1.3 CENTRAL PRESHOWER DETECTOR	228.7	228.7	0.5	-0.5
1.1.4 FORWARD PRESHOWER DETECTOR	514.9	514.9	0.1	-0.1
1.1.5 TRACKING ELECTRONICS	3,830.8	3,429.8	159.2	241.7
1.2 CALORIMETER	4,711.6	4,489.2	0.2	222.2
1.2.1 FRONT-END ELECTRONICS	4,402.6	4,180.2	0.2	222.2
1.2.2 INTERCRYOSTAT DETECTOR	309.0	309.0	0.0	0.0
1.3 MUON DETECTORS	9,493.1	8,568.2	164.3	760.6
1.3.1 COSMIC RAY SCINTILLATOR	1,223.2	963.2	0.0	260.0
1.3.2 CENTRAL TRIGGER DETECTORS	951.9	793.2	15.7	143.0
1.3.3 FORWARD TRIGGER DETECTOR	2,133.3	1,766.8	71.9	294.6
1.3.4 FORWARD TRACKING DETECTOR	1,410.8	1,297.2	45.3	68.3
1.3.5 FRONT-END ELECTRONICS	3,773.9	3,747.8	31.4	-5.3
1.4 TRIGGER	6,672.7	5,276.9	222.7	1,173.1
1.4.1 FRAMEWORK	1,859.4	1,859.4	0.0	0.0
1.4.2 LEVEL 0	136.4	130.6	2.2	3.6
1.4.3 LEVEL 1	1,588.2	1,356.0	41.6	190.6
1.4.4 LEVEL 2	2,039.8	1,104.5	178.9	756.4
1.4.5 LEVEL 3	1,049.0	826.5	0.0	222.6
1.5 ONLINE EQUIPMENT	828.0	644.9	85.7	97.4
1.5.1 ON-LINE EQUIPMENT	828.0	644.9	85.7	97.4

DEFINITION OF TERMS:

Funds: DØ Upgrade = M&S Equipment Funds; Solenoid = AIP Plant Funds.
 Cost Estimate: Total Project and Sub-Project estimates without contingency.
 Prior Year Obligations: Obligations for fiscal years '92 through '00 as applicable.
 FY 01 Year-to-Date Obligations: Obligations for fiscal year '01.
 Project Balance: Cost Estimate - (Prior Year Obligations + Fiscal 01 YTD Obligations)

DØ Upgrade Monthly Progress Report

for the month of December, 2000



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
YTD ACTUAL	597.4	831.3	971.5									
YTD PLAN												

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for the month of December, 2000

Active MOUs as of 12/31/00

<u>INSTITUTION</u>	<u>EQUIPMENT</u>	<u>R&D</u>	<u>COSTED</u>
Boston University	298	5,200	247,878
Brown University	820	131,000	215,083
California State University, Fresno	26		17,452
Indiana University	65		65,000
Institute for High Energy Physics (IHEP)	270		168,313
Kansas State University	208	135,808	205,662
Louisiana Tech University	98		64,295
Michigan State University	384	176,000	174,059
Northern Illinois University	148	28,000	166,000
Petersburg Nuclear Physics Institute	4		0
SUNY at Stony Brook	1	20,000	751,763
University of Arizona	826	44,600	643,879
University of IL, Chicago	129	24,100	91,042
University of Kansas, Center for Research, Inc.	16		15,931
University of Notre Dame	68	199,500	175,006
University of Oklahoma	43		38,433
University of Texas, Arlington	162		139,200
<u>University of Washington</u>	<u>105</u>	<u>6,200</u>	<u>82,650</u>
Total Fermilab Funds:	<u>\$4,752,605</u>	<u>\$682,012</u>	
Total Costed:	2,359,728	322,280	<u>\$2,682,008</u>
Total Open Commitments:	<u>\$2,392,877</u>	<u>\$359,732</u>	82,107

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Reportable Milestones Summary

<u>Done</u>	<u>Reportable Milestones</u>	<u>Project</u>	<u>Date</u>	<u>Baseline</u>	<u>Var.</u>
X	M1-Solenoid Delivered to Fermilab	Solenoid	5/12/97	5/12/97	0 w
X	M2-VLPC Production 50% Complete	VLPCs	8/31/97	8/31/97	0 w
X	M2-Central Preshower Module Fabrication Complete	Central Preshower	12/16/97	12/16/97	0 w
X	M2-Central Preshower Installed on Solenoid	Central Preshower	5/21/98	5/21/98	0 w
X	M1-Solenoid Installed and Tested	Solenoid	9/30/98	9/30/98	0 w
X	M2-Muon Forward Trigger Counter Assembly 10% Complete	Muon Forward Trigger	10/12/98	10/12/98	0 w
X	M2-Forward Preshower Module Fabrication Begun	Forward Preshower	11/4/98	11/4/98	0 w
X	M2-Muon Forward Tracker MDT Assembly 10% Complete	Muon Forward Tracker	1/29/99	1/29/99	0 w
X	M2 - Assembly Design Complete	Fiber Tracker	3/5/99	3/5/99	0 w
X	M2-First Cylinder Complete	Fiber Tracker	9/2/99	9/2/99	0 w
X	H Half-Wedge Fabrication 20% Complete	Silicon Tracker	10/15/99	10/15/99	0 w
X	3 Chip Ladder Fabrication 80% Complete	Silicon Tracker	10/26/99	10/20/99	0.6 w
X	Arrival Of C-Layer MDT Modules At FNAL	Muon Forward Tracker	11/3/99	10/22/99	1.7 w
X	9 Chip Ladder Fabrication 20% Complete	Silicon Tracker	11/4/99	11/3/99	0.2 w
X	M3-Fiber Tracker Ribbon Fabrication 50% Complete	Fiber Tracker	11/5/99	11/12/99	-0.9 w
X	First Readout Crate Installed & Working	Silicon Electronics	11/16/99	12/2/99	-2 w
X	SCA Testing Complete	Calorimeter Electronics	11/23/99	12/15/99	-2.8 w
X	MDT ADB Fabrication Complete	Muon Electronics	12/2/99	12/2/99	0 w
X	SLICs Received	Trigger	12/10/99	11/10/99	4 w
X	F Wedge Assemblies 20% Complete	Silicon Tracker	1/24/00	1/19/00	0.4 w
X	6 Chip Ladder Fabrication 20% Complete	Silicon Tracker	1/31/00	1/3/00	3.9 w
X	MDC Fabrication Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Muon Electronics Preproduction Installation Complete	Muon Electronics	1/31/00	12/13/99	5 w
X	M2-Fiber Tracker Assembly Begun	Fiber Tracker	2/1/00	12/6/99	6.2 w
X	M3-Establish Single Crate Internal Data Movement	Trigger	2/17/00	1/6/00	6 w
X	Shaper Hybrid 50% Complete	Calorimeter Electronics	2/22/00	5/9/00	-11 w
X	All Pixel Octants Assembled	Muon Forward Trigger	2/23/00	4/4/00	-5.8 w
X	M3-1st Forward Preshower Detector Complete	Forward Preshower	2/24/00	1/12/00	6.2 w
X	M3-Fiber Tracker Cylinders 8, 7, 6, and 5 Complete	Fiber Tracker	3/2/00	1/28/00	5 w
X	Steady DAQ Running	Online	3/17/00	3/31/00	-2 w
X	H Half-Wedge Fabrication 80% Complete	Silicon Tracker	3/29/00	2/23/00	5 w
X	M2-All Muon Forward Tracker MDT Modules At Fermilab	Muon Forward Tracker	3/30/00	3/10/00	2.8 w
X	Module Fabrication and Testing Complete	Forward Preshower	4/1/00	12/10/99	14 w
X	M3-2nd Forward Preshower Detector Complete	Forward Preshower	4/3/00	3/8/00	3.6 w
X	FEB, CB Production Complete	Muon Electronics	4/10/00	1/3/00	14 w
X	M3-ICD Tile Modules/Boxes Ready	Intercryostat Detector	4/19/00	1/18/00	13.2 w
X	M2-ICD Modules Arrive at Fermilab	Intercryostat Detector	4/24/00	1/25/00	12.8 w
X	M3-InterCryostat Detectors Installed	Intercryostat Detector	5/5/00	2/1/00	13.6 w
X	M3-Level Ø-South Installed	Luminosity Monitor	5/8/00	2/9/00	12.6 w
X	M3-Fiber Tracker Ribbon Fabrication Complete	Fiber Tracker	5/10/00	3/6/00	9.5 w
X	M3-Fiber Tracker Ribbon Mounting Complete	Fiber Tracker	5/13/00	4/20/00	3.3 w
X	M2-Fiber Tracker Assembly Complete	Fiber Tracker	5/26/00	5/4/00	3.3 w
X	6 Chip Ladder Fabrication 80% Complete	Silicon Tracker	7/12/00	3/14/00	16.8 w
X	M2-Calorimeter Preamp System Test Complete	Calorimeter Electronics	7/13/00	3/31/00	14.4 w
X	Low Mass Cables Available For Silicon South	Silicon Tracker	7/17/00	NA	0 w
X	Waveguide Production 50% Complete	Fiber Tracker	7/24/00	1/29/00	24.6 w
X	10 Digital Boards Available	Fiber Electronics	7/28/00	3/22/00	18 w
X	9 Chip Ladder Fabrication 80% Complete	Silicon Tracker	7/31/00	3/27/00	17.4 w
X	F Wedge Assemblies 80% Complete	Silicon Tracker	7/31/00	4/26/00	13.2 w
X	M2-Muon End Toroids Installed on Platform	Master	8/4/00	11/15/00	-14.2 w
X	Ten 8-chip Analog Boards Available	Fiber Electronics	8/8/00	4/19/00	15.4 w
X	M3-VLPC Cryo System Operational	VLPCs	8/18/00	6/12/00	9.6 w
X	B-Layer Octants Assembled	Muon Forward Tracker	8/24/00	4/18/00	18 w

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X	All MDT Octants Assembled	Muon Forward Tracker	8/24/00	7/14/00	5.8 w
X	Low Mass Cables Available for Silicon North	Silicon Tracker	9/4/00	NA	0 w
X	M3-VLPC Cassette Assembly 50% Complete	VLPCs	9/13/00	4/12/00	21.5 w
X	M2-First Silicon Tracker Barrel/Disk Module Complete	Silicon Tracker	9/14/00	1/24/00	33 w
X	SFE, SRC Fabrication Complete	Muon Electronics	9/21/00	2/3/00	32.5 w
X	South H-Disks Ready to Move to DAB	Silicon Tracker	10/13/00	7/3/00	14.4 w
X	MRC, MFC Production Complete	Muon Electronics	10/18/00	3/27/00	28.8 w
X	Preproduction MTCxx, MTFB, and MTCM Complete	Trigger	10/19/00	1/24/00	38 w
X	South Half-Cylinder Complete and Ready to Move to DAB	Silicon Tracker	10/25/00	8/1/00	12.2 w
X	M1-Begin Shield Wall Removal/Ready to Roll-in	Master	11/7/00	11/22/00	-2.2 w
X	M3-Waveguide Production Complete	Fiber Tracker	11/7/00	6/5/00	22 w
X	M3-Muon Level 1 Trigger Preproduction Testing Complete	Trigger	11/8/00	4/18/00	28.6 w
X	M3-All Silicon Tracker Barrels/Disks Complete	Silicon Tracker	11/22/00	8/25/00	12.6 w
X	Daughterboard Vendor Production Complete	Calorimeter Electronics	12/7/00	6/16/00	24 w
X	North Half-Cylinder Complete and Ready to Move to DAB	Silicon Tracker	12/12/00	9/18/00	12 w
X	M1-Central Silicon Complete	Silicon Tracker	12/12/00	9/18/00	12 w
	Timing System Installed	Calorimeter Electronics	12/13/00	8/18/00	16 w
	Drawers Ready	Intercryostat Detector	12/20/00	12/14/99	50.2 w
X	Muon Forward Tracker B-Layer Planes Installed	Muon Forward Tracker	12/22/00	6/15/00	26.2 w
X	All MDT Planes Installed	Muon Forward Tracker	12/22/00	8/4/00	19.2 w
X	All Muon Forward Trigger Detector Planes Installed	Muon Forward Trigger	1/12/01	8/25/00	18.6 w
X	M3-Calorimeter CC,ECN Preamp Installation Complete	Calorimeter Electronics	1/15/01	3/31/00	39.4 w
	Multichip Modules Received	Fiber Electronics	1/30/01	2/23/00	47 w
	Mixer Boards Ready	Fiber Electronics	1/31/01	6/22/00	30.2 w
X	MBTs Received	Trigger	1/31/01	3/16/00	44 w
	BLS Motherboard Assembly Complete	Calorimeter Electronics	2/5/01	8/7/00	24.6 w
	M2-Silicon Tracker Installed in Solenoid/Fiber Tracker	Silicon Tracker	2/9/01	9/25/00	18.8 w
	M3-VLPC Cassette Assembly Complete	VLPCs	2/12/01	8/22/00	23.4 w
	CFA Commissioning Complete	Muon Central	2/15/01	7/10/00	30.3 w
	PDT Commissioning Complete	Muon Central	2/20/01	6/9/00	34.8 w
	M2-Calorimeter BLS Assembly Complete	Calorimeter Electronics	2/26/01	9/26/00	20.6 w
	M1-Detector Rolled-in and Hooked Up	Master	2/27/01	2/2/01	3.4 w
	Production MTCxx, MTFB, and MTCM Complete	Trigger	3/2/01	6/27/00	34 w
	M3- Cal Readout Available to L2	Trigger	3/20/01	2/11/00	55.6 w
	Global Installation Complete	Trigger	3/23/01	7/12/00	35 w
	L2 Cal Installation Complete	Trigger	3/23/01	8/21/00	29.4 w
	Alpha Cards Received	Trigger	3/30/01	5/15/00	44 w
	L2 Muon Installation Complete	Trigger	4/27/01	7/26/00	38 w
	L2 CTT Installation Complete	Trigger	4/27/01	8/9/00	36 w
	M3-Trigger Level 2 Commissioned	Trigger	6/4/01	9/21/00	35 w
	M3-L3 Operational (One Full Chain)	Trigger	6/6/01	6/1/00	51 w